

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 66955-72057		FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2003/001134	International filing date (day/month/year) 27-06-2003	Priority date (day/month/year) 28-06-2002	
International Patent Classification (IPC) or national classification and IPC G05B 19/418, G05B 17/02, G05B 11/32			
Applicant UMETRICS AB ET AL			

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☐ (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 23-01-2004	Date of completion of this report 03-09-2004
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Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

☒ the international application as originally filed/furnished

☐ the description:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the drawings:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>3, 5-10, 15</u>	YES
	Claims	<u>1, 2, 4, 11-14, 16, 17</u>	NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-17</u>	NO
Industrial applicability (IA)	Claims	<u>1-17</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: EP 0537041 A1 D4: US 5751582 A
D2: WO 0129630 A1 D5: US 5408405 A
D3: WO 9919780 A1 D6: JP 2002157003 A

Documents D5 and D6 define the general state of the art.

Document D1 discloses a method and an apparatus for monitoring and fault detection in an industrial process. The process involves a succession of stages (P1 to Pn), transforming a product from an initial stage to a final stage (Y0 to Yn). For each stage, a mathematical model of the process is used to calculate the state of the product. The model uses both measurement values from sensors and information from a previous process stage (see abstract).

Document D2 discloses a method for providing a process model for a material in a manufacturing process. The manufacturing of the material is done in several stages and each stage is modelled. The method includes the steps of receiving stress and distortion information of the material from a previous manufacturing process, and determining updated stress and distortion information of the material from a process model for the present manufacturing process. The updated stress and distortion information is a function of the stresses and distortions from the previous manufacturing process. Thereafter, the updated stress and distortion information of the material is provided to a subsequent manufacturing process (abstract; page 10, lines 4-23).

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

Document D3 discloses a method and a device for monitoring a process having at least two sub-processes. Multivariate models are used (abstract).

Document D4 discloses a method for controlling a plurality of parameters in a manufacturing process. The method in D4 has a feedback between the processes (column 8, lines 10-17; fig.4).

The claimed invention relates to a method and a device of monitoring and fault detection in industrial processes. More specifically, the claimed invention relates to a method of applying multivariate techniques in the sequential transfer of quality parameters by means of score values. The purpose is to monitor and detect faults at the earliest possible stage in a process chain.

Document D1 is considered to represent the closest prior art. Each process stage in D1 receives information from the previous process stage. This information is related to a multivariate model that is calculated for the previous process stage. Data, related to each process stage, is also collected. All the information, both received and collected, is then used in a multivariate model that represents the actual process stage (column 3, line 14-column 4, line 23). Also, note document D2, which discloses a process with several process stages. Each stage has a multivariate model.

Therefore, the invention according to claims 1, 13 and 16 lacks novelty.

In document D1, information is transmitted to a third process stage (fig.1). Process data is collected by sensors and the results are used in an on-line simulation of the whole process chain (abstract).

Therefore, the invention according to claims 2, 4, 11, 12, 14 and 17 lacks novelty.

Information of data feedback is common within the field of control engineering. For example, document D4 discloses an example of feedback between processes. It is therefore an obvious detail for a person skilled in the art to use feedback in the method and apparatus disclosed in D1.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

Consequently, the invention according to claims 3 and 15 is not considered to involve an inventive step.

The invention according to claims 6-10 differs from document

D1 in that the collected data is arranged in matrixes, where a first matrix contains process data and a second matrix contains quality data, that the sub-models are calculated using a "principal component analysis" like method (PCA) or a "PLS" like method, and that the results are plotted.

However, document D3 discloses a method for monitoring a process where multivariate models, based upon PCA and PLS methods, are used (page 11, lines 28-31). Further, process and quality variables are measured (page 8, lines 9-14) and the results are plotted (70 in fig.1; page 8, lines 21-23) in order to give the operators direct on-line information of the ongoing process.

A modification of the invention according to D1, with knowledge from document D3, would result in a method according to patent claims 6-10. Since both D1 and D3 relate to the same technical field, and no unexpected effect is obtained, the combination of what is known from D1 and D3 is considered obvious for a person skilled in the art.

The invention according to claims 6-10 is thus not considered to involve an inventive step.

Further, the subject matter of claim 5, i.e. the transferring of special quality parameters, is only considered as obvious to the skilled person.

Therefore, the invention according to claim 5 is not considered to involve an inventive step.

The invention is industrially applicable.